CERTIFICATION

I, Yukie KOJO, of 1-2-16 Tennou, Ichinomiya-shi, Aichi-ken, 491-0046, Japan, accompanying certified copy of the documents in respect of an application for a patent filed in Japan on the 28 day of January, 1998 and of the official certificate attached thereto, and certify that the following is a true and correct translation to the best of my knowledge and belief.

Yukie Kojo

Dated this 2 day of May, 2003

PCT/JP98/03222

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PATENT OFFICE

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This is to certify that the annexed is a true copy of the following application as filed with this office.

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[Document] Abstract 1

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INTERIOR MEMBER FOR AIR BAG

[Scope of Claims for a Patent]

[Claim 1]

An interior member for an air bag comprising a main body provided with an air bag swelling-out port, and a cover body forming a thin wall portion which is ruptured at a time when the air bag is swollen out, in a part thereof and closing said air bag swelling-out port, characterized in that an opening edge of the air bag swelling-out port of said main body and an outer peripheral edge of said cover body are mechanically connected.

[Detailed Description of the Invention]

[0001]

[Technical Field Pertinent to the Invention]

The present invention relates to an interior member for an air bag, and more particularly to a connecting structure between a cover body closing an air bag swelling-out port and an interior member main body.

[0002]

[Prior Art]

In recent years, there has been provided an air bag for a front passenger seat and a so-called side air bag for improving a safety, and in this case, the air bag is placed in an inner side of an interior member made of synthetic resin such as an instrument panel, a door trim or the like, and is swollen out into a passenger room from an air bag swelling-out port provided in this interior member. Further, generally, this air bag swelling-out port is closed by a cover body (an air bag cover) having a

thin wall portion which is easily ruptured at a time when the air bag is swollen.

[0003]

Conventionally, the air bag cover mentioned above is manufactured as a separate body from the instrument panel or the like and is attached over an opening edge of the air bag swelling-out port by means of a screw fastening or the like, however, a lot of labor hour is required for manufacturing and assembling. Then, for example, in Japanese Unexamined Patent Publication No. 9-2187, there is proposed an interior member for an air bag in which the labor hour mentioned above can be solved by integrally molding the air bag cover with the main body of the interior member in accordance with a two-color molding.

[0004]

However, in the interior member for the air bag obtained in accordance with the two-color molding described in the publication mentioned above, a hard synthetic resin material such as a polypropylene (PP) or the like is used for the main body, and an olefin-based thermoplastic elastomer (TPO) or the like compatible with the polypropylene (PP) or the like is used for the air bag cover, and the air bag cover and the main body are connected at the same time of an integral molding.

[0005]

[Problem to be solved by the Invention]

However, in the connection between the air bag cover and the main body in accordance with the welding utilizing the compatibility, since a combination of materials usable for the air bag cover and the main body is limited, there is a problem that it is hard to select a material which satisfies physical properties or the like required for both members.

[0006]

Accordingly, the present invention solves the problem mentioned above, and an object thereof is to provide an interior member for an air bag in which a combination of material between a cover body and a main body is free and a firm connection between the both is achieved.

[0007]

[Means for Solving Problem]

In order to achieve the objects mentioned above, in accordance with the present invention, there is provided an interior member (1) for an air bag comprising a main body (11) provided with an air bag swelling-out port, and a cover body (2) forming a thin wall portion (24) which is ruptured at a time when the air bag is swollen out, in a part thereof and closing the air bag swelling-out port, in which an opening edge (111) of the air bag swelling-out port (12) of the main body (11) and an outer peripheral edge (21) of the cover body (2) are mechanically connected. This mechanical connection can be achieved, for example, by a caulking or a fitting portion.

[0008]

In accordance with the present invention, since main body and the cover body are mechanically connected in accordance with the caulking or the like, there is not a limitation that a compatibility is required in the material used for the main body and the cover body, in comparison with the conventional connection in accordance with the welding, and it is possible to widely select a material which satisfies the physical properties or the like required for the both.

[0009]

In this case, reference numerals in parentheses mentioned above show a relation of correspondence to particular means described in

embodiments mentioned below.

[0010]

[Mode for Carrying out the Invention]

(First Embodiment)

In Fig. 1, there is shown an enlarged perspective view of a front passenger seat side portion of an instrument panel 1 corresponding to one embodiment of an interior member for an air bag. The instrument panel 1 is made of a hard synthetic resin material such as a polypropylene (PP) mixed with a rubber or a filler, and an approximately rectangular air bag swelling-out port 12 is formed on an upper face of a main body 11 thereof at a center position in a back and forth direction (an oblique vertical direction in Fig. 1). Further, this air bag swelling-out port 12 is closed by an air bag cover 2 made of a PC (polycarbonate)/ABS (acrylonitrile-butadiene-styrene) alloy or the like which is not compatible with the PP, and formed in accordance with a two-color molding mentioned below. A cross section of the air bag swelling-out port 12 portion is shown in Fig. 2.

[0011]

In Fig. 2, an outer peripheral edge 21 of the air bag cover 2 is bent along a lower surface of an opening edge 111 of the air bag swelling-out port 12 in the instrument panel main body 11, and is caulked and fixed by a boss 14 provided on the lower surface in a protruding manner. That is, a lot of bosses 14 are formed on a lower surface of the opening edge 111 of the instrument panel main body 11 with a peripheral interval as shown in Fig. 1, these bosses 14 extend downward through the peripheral edge 21 of the air bag cover 2, and leading ends thereof are collapsed by heat so as to be caulked. Accordingly, this air bag cover 2 is firmly

connected to the instrument panel main body 11.

[0012]

An outer peripheral surface of the air bag cover 2 is stepwise lowered in an entire periphery thereof, whereby a recess groove 22 is formed with respect to an opening peripheral surface of an air bag swelling-out port 12. A rib 23 protruding linearly along a front line (a left line in Fig. 2) of the air bag cover 2 and obliquely forward is formed in a back face of the front line, and this rib 23 is covered with a metal retainer 231, and is connected to a bracket 31 of an air bag case 3 positioned at the back of the air bag cover 2 by a bolt 41 and a nut 42. The air bag case 3 in which the air bag is received, is fixed to an insert member 13 of the instrument panel main body 11 via a bracket 32 by a bolt 43 and a nut 44.

[0013]

Back faces along three lines of the air bag cover 2 except the front line mentioned above are deep recessed in a direction of a front face, and a thin wall portion 24 which is ruptured at a time when the air bag is swollen out is formed with respect to the recess groove 22. Accordingly, in the case that the air bag is swollen, the thin wall portion 24 (Fig. 1) in three lines of the air bag cover 2 is ruptured, the air bag cover 2 is left open into a passenger room (the above in Fig. 2) around a portion near a root of the rib 23 corresponding to a hinge center, and the air bag is swollen out from the air bag swelling-out port 12.

[0014]

The instrument panel 1 for the air bag as mentioned above is manufactured in accordance with a two-color molding described below. That is, in Fig. 3, a convex strip 52 having the same shape as that of the recess

groove 22 mentioned above is formed on an outer periphery of a mold face in a slide type opposite mold 51 within an upper mold 5, an end face of a slide core 61 within a lower mold 6 comes in press contact with en end face of this convex strip 52, and an air bag cover molding space S1 and a main body molding space S2 in an outer side thereof are separated. Further, a lot of columnar recess portions 62 extending to an inner portion with a fixed depth are peripherally formed on the end face of the slide core 61 with keeping an interval, and these recess portions 62 are communicated with the main body molding space S2. The PP material is injected into the main body molding space S2 mentioned above, whereby the instrument panel main body 11 is molded, and the PP material is simultaneously injected into teach of the recess portions 62, whereby the boss 14 mentioned above is molded.

[0015]

During the period that the hard synthetic resin material within the main body molding space S2 is yet in a semisolid solution state, subsequently as shown in Fig. 4, the slide core 61 is moved backward at a fixed amount, whereby the main body molding space S2 and the air bag cover molding space S1 are communicated. Then, in this state, PC/ABS alloy material which is not compatible with the PP material mentioned above is injected into the air bag cover molding space S1. The PC/ABS alloy material fills up the air bag cover molding space S1, enters into a gap space S3 generated by the slide core 61 moving backward so as to form an outer peripheral edge 21 of the air bag cover 2, and fills a periphery of the boss 14. In this state, after being taken out from the metal mold, a leading end of the boss 14 protruding from the lower surface of the opening edge 111 of the air bag swelling-out port 12 (Fig. 2) in the instrument panel main

body 11 is collapsed by heat so as to be caulked.

[0016]

(Second Embodiment)

In Fig. 5, there is shown another embodiment of the connecting structure between the outer peripheral edge 21 of the air bag cover 2 and the instrument panel main body 11. In the drawing, a convex strip 15 having a chevron cross sectional shape in an entire periphery thereof is formed on the lower surface of the opening edge 111 of the air bag swelling-out port 12 in the instrument panel main body 11, and on the other hand, a recess groove 26 is formed on the upper surface of the outer peripheral edge 21 of the air bag cover 2 integrally formed with the instrument panel main body 11 in accordance with the two-color molding, and the convex strip 15 is fitted to the recess groove 26. Further, in accordance with the shape of the slide core at a time of two-color molding, the convex strip 25 having the same cross sectional shape as that of the convex strip 15 is formed on the lower surface of the outer peripheral edge 21 of the air bag cover 2, and this is fitted into a recess groove 33 which is formed in a bracket 32 of the air bag case 3 (Fig. 2) by bending. As mentioned above, the air bag cover 2 is clamped between the instrument panel main body 11 and the bracket 32 in a state in which the recess groove 26 and the convex strip 25 are respectively fitted to the convex strip 15 of the instrument panel main body 11 and the recess groove 33 of the bracket 32, thereby being connected to the instrument panel main body 11.

[0017]

(Third Embodiment)

In Fig. 6, there is shown the other embodiment of the connecting structure between the outer peripheral edge 21 of the air bag cover 2 and

the instrument panel main body 11. In the drawing, a recess groove 16 having a chevron cross sectional shape in an entire periphery thereof is formed on the lower surface of the opening edge 111 of the air bag swelling-out port 12 in the instrument panel main body 11, and on the other hand, a convex strip 28 is formed on the upper surface of the outer peripheral edge 21 of the air bag cover 2 integrally formed with the instrument panel main body 11 in accordance with the two-color molding, and is fitted to the recess groove 16. Further, in accordance with the shape of the slide core for two-color molding, a recess groove 27 having the same cross sectional shape as that of the recess groove 16 is formed on the lower surface of the outer peripheral edge 21 of the air bag cover 2, and this is fitted into a convex strip 34 which is formed in a bracket 32 of the air bag case 3 (Fig. 2) by bending. As mentioned above, the air bag cover 2 is clamped between the instrument panel main body 11 and the bracket 32 in a state in which the convex strip 28 and the recess groove 27 are respectively fitted to the recess groove 16 of the instrument panel main body 11 and the convex strip 34 of the bracket 32, thereby being connected to the instrument panel main body 11.

[0018]

(Other Embodiments)

It is not always necessary that the instrument panel main body 11 and the air bag cover 2 are molded in accordance with the two-color molding, and it is possible to employ a method of molding the air bag cover 2 by using the preformed instrument panel main body 11 as an insert, a method of independently molding each of the instrument panel main body 11 and the air bag cover 2 and assembling them, or the like. In the case of employing these methods, the combination of the convex strips 15 and 25 and the recess

grooves 26 and 33 in Fig. 5 of the second embodiment, or the combination of the convex strips 27 and 28 and the recess grooves 16 and 27 in Fig. 6 of the third embodiment may be set to only the combination of any one convex strip and recess groove. Further, the cross sectional shapes of the convex strips and the recess grooves are not limited to those in each of the embodiments. It is not always necessary that the boss 14 in the first embodiment is formed in the columnar shape, a rectangular columnar shape, a wall shape or the like can be employed. Further, the boss may be provided in a side of the air bag cover 2.

[0019]

[Effect of the Invention]

As described above, in accordance with the interior member for the air bag on the basis of the present invention, since the firm connection between the both is achieved without limiting the combination of material between the cover body and the main body, it is possible to widely select the material which satisfies the physical properties or the like required for the cover body and the main body.

[Brief Description of the Drawings]

[Fig. 1]

Fig. 1 is an enlarged perspective view of a front passenger seat side portion of an instrument panel for an air bag in accordance with a first embodiment of the present invention.

[Fig. 2]

Fig. 2 is a cross sectional view along a line II-II in Fig. 1.

[Fig. 3]

Fig. 3 is a cross sectional view of a metal mold at a time of molding the instrument panel for the air bag.

[Fig. 4]

Fig. 4 is a cross sectional view of the metal mold at a time of molding the instrument panel for the air bag.

[Fig. 5]

Fig. 5 is a cross sectional view of an outer peripheral edge portion of an air bag cover in accordance with a second embodiment of the present invention.

[Fig. 6]

Fig. 6 is a cross sectional view of an outer peripheral edge portion of an air bag cover in accordance with a third embodiment of the present invention.

[Description of Reference Numerals]

1 ... instrument panel for air bag,

11 ... instrument panel main body,

111 ... opening edge,

12 ... air bag swelling-out port,

2 ... air bag cover,

21 ... outer peripheral edge.

Abstract

[Problem To Be Solved]

To realize firm connection an air bag to an instrument panel without restriction in combination of the materials thereof.

[Solution]

An instrument panel 1 comprises a main body 11 having an air bag swelling-out port 12 and an air bag cover 2 having a thin wall potion24 broken when an air bag is expanded and closing the air bag swelling-out port 12. A boss 14 is protruded from the bottom surface of the opening edge 111 of the air bag expanding opening 12 of the instrument panel main body 11 to pass through the outer peripheral edge 21 of the air bag cover 2 and the tip end thereof is thermally caulked to bond the air bag cover 2 to the instrument panel main body 11.